

Servohydraulic Testing Machines
UMIB Series
Force: 600 / 1000 kN

Introduction

Designed for top demanding test applications.
Used for static, quasistatic and dynamic (low freq) tests.



Tensile, compression, bending, folding, shearing, etc test can be carried out with the appropriate devices.

Over metallic and non-metallic materials

No dimension limits. Width, depth and height case by case defined

Load cells, gripping heads and testing fixtures developed and adapted to each test method

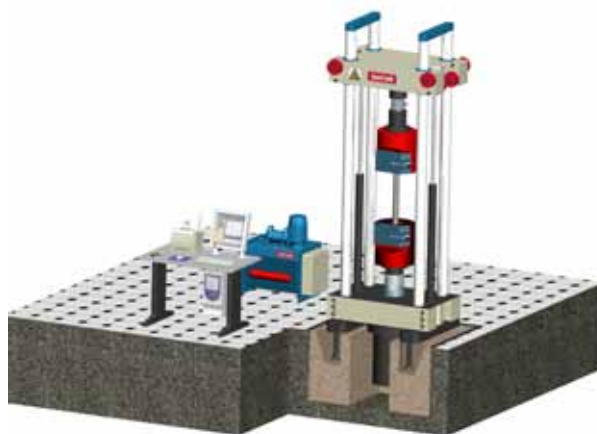
Fullfilling widely the requirements imposed by the international Standards (mainly EN and ASTM) and/or by the Materials Resistance Control of Quality Dpts. of our customers such as Certified laboratories, Universities, Research and Technological centres, etc.

This quality level is reached with a studied combination of accurate design, top quality components and final performance verification.

Models

REFERENCE	MAX LOAD
UMIB - 600 MD2W	600 kN
UMIB - 1000 MD2W	1000 kN

Other capacities on demand



NEW: ALL in One touch PC interface

New user interface, with embedded touch screen PC, modern, easier and with improved performances.



A real alternative to conventional table top PC's, combining a compact CPU design with TFT touch-screen, with all the performances of traditional desktop PC systems.

The PC "All in One" saves laboratory space and offers a good working position, with WinTest32 software and testing fixtures.

MAIN FRAME

Manufactured according to UNE 7-474, DIN 51221, 51223, 51227, 51228, BS 1610 and EN 10002-2

- › High rigidity four columns testing frame
- › Single testing space with adjustable height
- › Mobile crossheads along the columns, with scrapers.



Double-acting hydraulic piston mounted below the lower crosshead, aligned with the lower tensile gripping head.

Piston can be also mounted over the upper crosshead on demand.

Guiding system of the piston available external along the columns, or with an antirotating system internally placed.



Piston guiding system

The upper tensile gripping head is serial mounted with the load cell on the upper plate.

The large free distance between gripping heads (makes possible to use devices to perform tests at high and low temperatures, and test large specimens without the need of modifications).

CLOSED LOOP CONTROL

Signals coming from different transducers (load cell, encoder, extensometer, etc) are compared with the command value, defined previously on the test parameter via software. The error of the comparison is sent to the servovalve to be corrected, closing the control loop.

The frequency of this loop is 1 kHz (1000 times per second) with MD2/MD22 modules and 5 kHz (5000 times per second) with MD5/MD58 modules.

Data received from the transducer is sent to the PC via USB or ETHERNET connections. WINTEST32 software acquires the data in real time to create graphics and to show test measures and results.



UMIB-600, with hydraulic gripping heads

Elements identification

- 1. Mobile upper crosshead**
- 2. Mobile lower crosshead**
With precision mechanizing for smooth movement along columns, optimum rigidity for frame undeformation and with proper dimensions for piston and testing devices hosting.
- 3. 4 Chromed high stiffness columns:** to assure rigidity, optimum load sharing and axiality
- 4. Hydraulic gripping heads:** with wedge closing system.
- 5. Load cell:** high accuracy, low profile
- 6. Lateral hydraulic actuators:** for crosshead movements
- 7. Hydraulic blocking system:** automatically actioned from the software
- 8. Mechanical blocking system**
- 9. Columns anchoring system:** to assure perfect column alignment, needed for axial loading assurance during test, perfect load sharing and soft movement of crosshead.

AUTOMATIC CROSSHEADS POSITIONING

Both crossheads can be moved by means of hydraulic actuators, via WINTEST software,

It increases applications versatility, allowing to adapt the vertical testing space to each specimen dimensions.

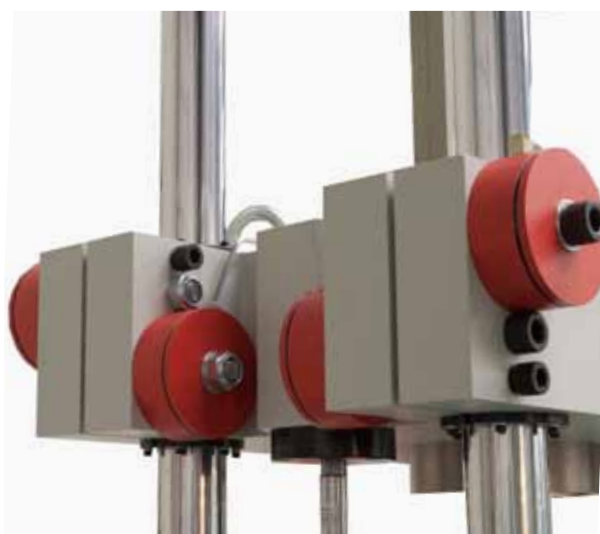


Adaptable testing area

Upper crosshead provided with hydraulic blocking system. Special oil non-return system that avoids leak-tightness problems.

Each time machine is powered on, the system recovers the maximum blockage pressure.

The locking system is operated automatically from WINTEST software



Upper crosshead: Hydraulic

Lower crosshead includes manual blocking system. Plate-column friction system based on high-strength screws



Lower crosshead: blocking system

DISPLACEMENT MEASUREMENT

By means of an optical incremental transducer of 1 micron resolution



Transducer for piston position

For controlling piston position, automatic return to starting position and stroke control (mm/min).

Once the test is ended, piston can return to the initial test position to be ready for the next test. Really useful for serial/repetitive tests. This advantage can be activated or not on Win Test32 software

Optionally linear transducer can be placed inside the piston



Optional metal protective frame for the hydraulic group



LOAD MEASUREMENT

By means of an universal full bridge strain gage load cell mounted on the upper crosshead

- › **Robust design** to withstand eventual overloads
- › **High accuracy** to assure machine's Class 0,5 (ISO 7500-1) from 1 to 100% of its nominal capacity
- › **Additional load cells** can be installed, to increase the load measuring precision and/or for special apps.
- › **Self recognition system for load cells.** Allows control to get auto configured according to the capacity and calibration of the load cell mounted. Time effective and safety improving (avoids overloads)
- › **High repeatability and linearity design**



Load cell

STANDARD TENSILE GRIPPING HEADS

The machine most common tensile gripping-heads, has hydraulic closing system.



Hydraulic tensile gripping heads

Supplied with interchangeable wedge jaws to be adapted to the dimensions and shape of sample's section



Due to the applied initial clamping force, these wedge type grips are also suitable for testing metallic and non metallic specimens even with high surface hardness.

Includes a remote control unit UCRB for independent opening and closing of the jaws of each gripping head.

On demand advanced remote controller UCRD-7 can be included



Remote Control for opening / closing jaws and piston positioning

The wedge lock system of the heads allows direct or indirect mounting of many other tensile devices:



Tensile device for proportional mechanized samples high temperature testing

DEVICES FOR BENDING AND COMPRESSION TESTS

Compression plates and bending test devices, can be directly placed over the gripping heads, minimizing devices change time.

We can make special couplings according to our customers specifications, for various applications, only limited by the available space and the testing capacity of the machine, in load or displacement.



Compression plate mounted on hydraulic clamp

Technical specifications for UMIB TESTING Machines

SERIE	UMIB 600	UMIB 1000
Maximum load	600 kN	1000 kN
Load measurement	Universal strain-gage load cell (tension-compression). Additional load cells can be installed	
Load cell Repeatability	Better or equal to ± 0.05 %	
Measuring Range	1 % to 100 % of the load cell nominal capacity (autoescale)	
Class	0.5 according to ISO 7500	
Strength Resolution	5 dígits with floating coma	
Vertical free clearance, with load cell and standard gripping heads	Adjustable from 0 to 1000 mm	
Number of columns	4 Chromed plated and grounded with adjustable mechanical stops	
Free distance between columns	520x250 mm	710x405 mm
Mobile Crosshead	Automatic movement by means of lateral hydraulic synchronous jacks. With hydraulic (upper) and mechanic (lower) blocking system	
Displacement measurement	Encoder. Optional piston internal LVDT	
Power supply	Three-phase 380 V plus neutral and earth, 50/60 Hz (to specify)	
Total power	3 kW	4 kW
Emergency stop	"Mushroom" type, placed on the testing frame and working table	
Dimensions: Testing frame (mm)	1020 x 650 x 2450 (h)	1200 x 650 x 2600 (h)
Approx Weight (without gripping heads)	2100 kg	3500 kg
Dimensions / working table weight	1200 x 800 x 900 mm (width x depth x height)/ 40 kg aprox.	
Foundation	Special foundation must be performed to allow piston hosting and correct leveling. IBERTEST will provide with the drawings and instructions for a correct execution	

IBERTEST reserves the right to modify the specifications described without notice.

MD CONTROL ELECTRONIC

Modular and computer independent electronic system. Based on last generation microprocessors and designed specifically for closed loop control and data reading on high performance testing solutions.

Maximum performance in accurate and real time variables reading, close loop control and data sending to external processing on WINTEST software.

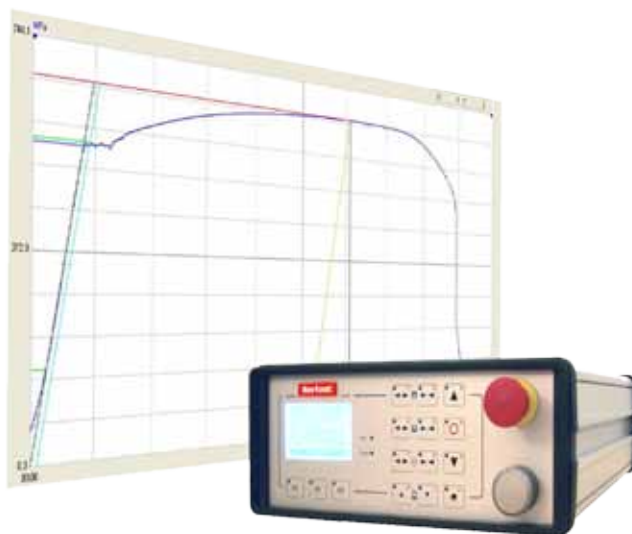
The MD system replaces the conventional PC-internal control boards. It widely improves control performance, reliability (not subject to PC failures) and data acquisition speed.

Data received from transducers is sent via full speed USB (or Ethernet) connection to a computer to be processed by the WINTEST 32. The information received by WINTEST software is managed in real time to perform graphics, calculate formulas and show test results.

Due to PC independent and external configuration, the computer provided with the machine can be easily replaced.

Highly useful when computer fails due to hardware (component) or software (virus) problems.

Machine configuration, calibration, transducers information, etc won't be affected as all the information is stored in the MD module.



External table top configuration with front panel. Models MD22 y MD58

CONTROL ELECTRONICS



MD2 module, bulk-in configuration. With protective case to be placed in machines' electric area.
o en el cuadro eléctrico de la máquina de ensayos



MD2 module, placed in the base housing of a TESTCOM machine



External table top configuration, without front panel. Optional for MD2 and MD5

CONTROL OPTIONS

MD electronics allows to close the control loop with the applied load (control in kN/s) or with the position (control in mm/s) or with the material deformation (control in mm/s):

Load control

The MD module receives the signal from machine's load transducer (load cell or pressure transducer) and compares this feedback value with the command value (*N/s ó kN/s*).

Position control

The MD module receives the signal from machine's position transducer (*encoder, resolver, LVDT, etc.*) and compares this feedback value with the command value (*mm/min*).

Deformation control

The MD module receives the signal from machine's deformation transducer (extensometer) and compares this feedback value with the command value (*mm/s or mm/min*).

Deviation correction

The error (deviation between command and feedback) is processed with a PID

The three signals coming from the PID are combined to generate a new command signal, sent to the servo-valve or servomotor to eliminate, in the minimum possible time and with stability, the deviation.

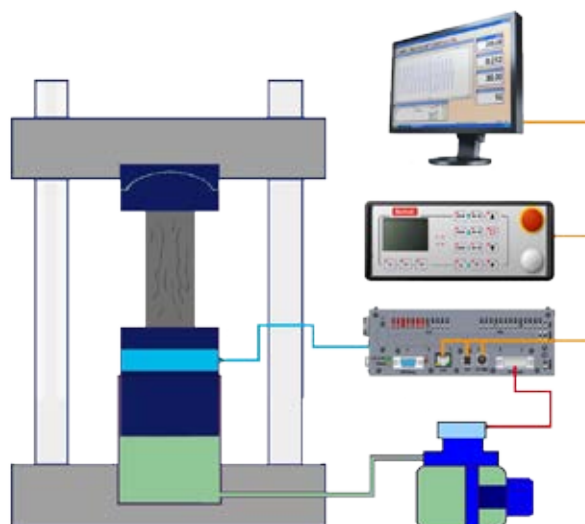
The time used in this process (detection, evaluation and new signal generation is called, closed loop control time.

Applications of each type of control

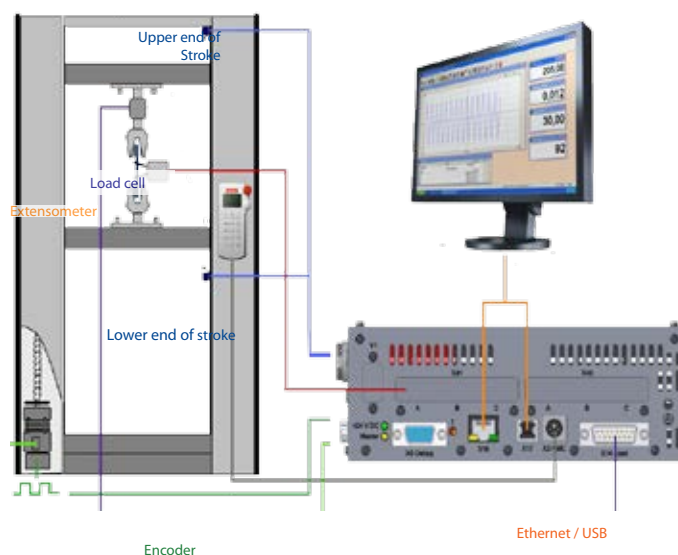
Load control is normally used on low load resistance tests materials which undergo deformation just before fracture, such as concrete, cement, ceramics, rocks, adhesives, etc. as well as in metals test on material elastic zone.

Position control is used in materials with high deformation, as rubers, elastomers, etc as well as on metals after elastic range.

Deformation control is used in fracture tests and for research applications.










Scheme of load control for servo-hydraulic testing machines



Automatic control change

WINTEST 32 software allows to define several criteria for changing control automatically (defined variation in the slope of the graphic, certain value of strength, load, position or deformation). Widely used in several applications as in metals testing to allow the control change among materials regions (elastic to plastic)

MD VERSIONs and Specifications

MODULE	MD2	MD22	MD5	MD58
Front View				
Rear View				
Aplication	Static tests		Static and Dynamic Tests	
Microprocessor	CPU 133 MHz		CPU 800 MHz Control: DSP 32 bit	
Channels	Up to 4		Up to 8	
Resolution	± 180.000 steps per channel			
Max sampling fere- quency	1 kHz 1000 reading per sec per channel		5 kHz 5000 reading per sec per channel	
Sincronization	All channels fully synchronous and simultaneous			
Closing loop time	1 milisecond (1000 times per second)		0,2 milisecond (5000 times per second)	
Drive interface	±10V-Command-Output (generated with ±15 Bit resolution) I/O's and relays for safety functions			
Expansion possibilities	Up to 8 modules can be connected. 32 total synchronous channels		Up to 32 modules can be connected. 256 total synchronous channels	
PC communication	USB 2.0 full speed and/or Ethernet 10 / 100 Mbit			
Digital Inputs (24 V)			8	
Digital outputs (24 V)			8	
Serial sensor interface			COM1 (internal)	
Debug interface			COM2: 115 kB	
Slot for safety shield			YES	
Power supply	DC. 24 V		AC.100 – 250 V	
Remote control UCRD-7	YES	NO	YES	NO

UCRD-7 ADVANCED REMOTE CONTROL UNIT



Basic features

1. **Actuator movement:** Piston or crosshead
Via Up /Down keys or with the Digi-Poti for accurate positioning
2. **Intermediate crosshead movement:**
For electro-hydraulic machines (with piston +mobile crosshead).
3. **Control START / STOP:**
Activates MD module control
4. **Grips opening and closing:**
Upper/lower grips independent operation
5. **Extensometer positioning**
For automatic versions
6. **Emergency stop:**
According to CE mark requirements
7. **LCD graphics display of 128 x 64**

Advanced features

The UCRD-7 is not only a remote controller, aside its benefits related with ergonomic test preparation, grips operation and accurate movement, it has the capability of **carrying out test independently**.

Without the need of a computer and software, several test can be configured and executed directly on the UCRD-7

- › General Tension/Compression
- › Tensile test over metals
- › Bending
- › Shear
- › Tear
- › Brazilian
- › Cycles

Example: Tensile test over metals

Results showed/calculated by UCRD-7 :

- › Original cross-sectional area of the gauge length
- › Tensile strength
- › Percentage elongation at maximum load (Fm)
- › Load at fracture
- › Percentage elongation at fracture load (Fb)
- › Young's modulus (only with extensometer)
- › Proof stress points: 3 points (only with extensometer)
- › Proof stress point at total elong(only with extensometer)
- › Upper/lower yield stress
- › Percentage reduction of area after fracture
- › Percentage elongation after fracture

Type of available control :

- › Load - Position
- › Load-Extension-Position (only with extensometer)

Control change between materials ranges

With the following criteria, end of elastic range, end of yield range and breakage can be detected.

- › Defined values: Mpa, kN/mm², kN, N
- › Relative drop in relation to Fm: %
- › Absolute drop: N, kN

Sample definition:

- › Thickness, widthness, diameter, initial section(So), gauge length (lo), parallel length (lc)

Test configuration:

- › Pre-load value and speed to reach preload
- › Maximum stress speed within elastic range.
- › Maximum extension speed within yield range.

WINTEST32 SOFTWARE FOR MATERIALS TESTING

Introduction

32-bit software pack, running under Windows™, specially developed by IBERTEST to be used in universal testing machines.

Thanks to its flexibility and power, you can easily customize software WinTest32, to every need.

Indeed, the system allows user to configure tests according to the major international standards for engineering materials (UNE, ASTM, ISO, ... etc). However, for a small supplement, IBERTEST can adapt WinTest32 software to special needs or for your laboratory.

During design phase of WinTest32 software, IBERTEST paid special attention to the ease of use, so the program can be handled even by users with little experience in computers.

The WinTest32 control screen provides toolbar and intuitive menu for quickly identify available actions, to select and configure test parameters without consulting the manual..

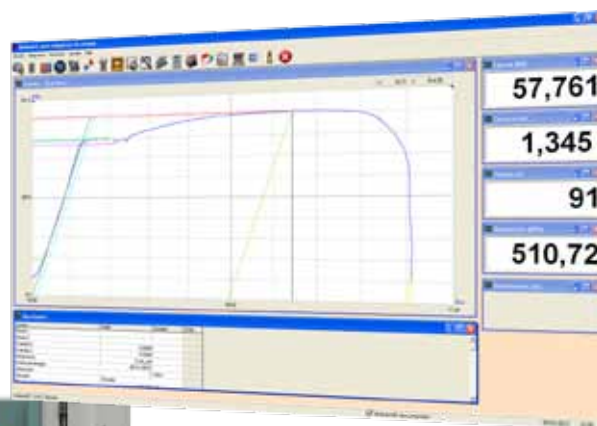


The software shows the user available options and its possible settings at each time, guiding user step by step interactively through test configuration.

Thus, WinTest32 helps user to optimize processes when using materials testing machine, getting the best performance both in the execution of the test and in the results analysis.



Initial control screen



Screen of test results



Software WINTEST32 usage on a Totech Screen "All in One"

WINT32 SOFTWARE PROVIDES COMPLETE CONTROL **BEFORE, DURING AND AFTER** THE EXECUTION OF THE TEST.

1. PRE-TEST CONFIGURATION

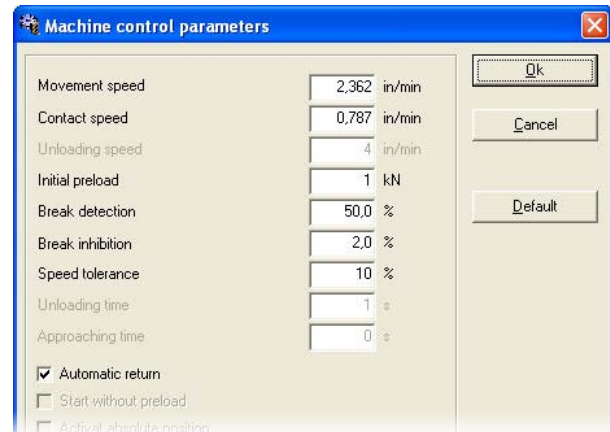
To configure tests at your convenience, the software offers many options, such as:

- › **Setting-up of the machine:** Establishment of safety limits, speed of movements, preload, automatic return, etc.
- › **Users management,** with custom options for each operatuser. Provides system security and prevents unauthorized use.
- › Type of test to perform: Tensile, compression, bending, cycles, etc. The settings change automatically according to the chosen type of test.
- › Working method: **preconfigured** by IBERTEST (according to a Standard Test) or **free configuration** according to the criteria of the user (always within the physical and mechanical limitations of the machine, testing devices and sensors.)
- › **Individual or serial testing.** Serial tests are well suited for example, repetitive tests with machines intended for Production Quality Control.
- › Select the type of automatic control in **stroke, load or strain** (with appropriate optional transducers)
- › Activation of **additional sensors** placed on the machine or in the specimen, such as strain gauges, temperature sensors, etc.¹
- › Select the type of **diagram** (load-time, load-stroke, load-strain, etc.). For the **graphical representation** of the test.
- › **Results to display** on screen (in real time) or in the report (after the validation of the test).
- › Automatic execution of calculations derived from the test results (strength, elastic modules, etc.) by means of a software integrated **programmable calculator**.

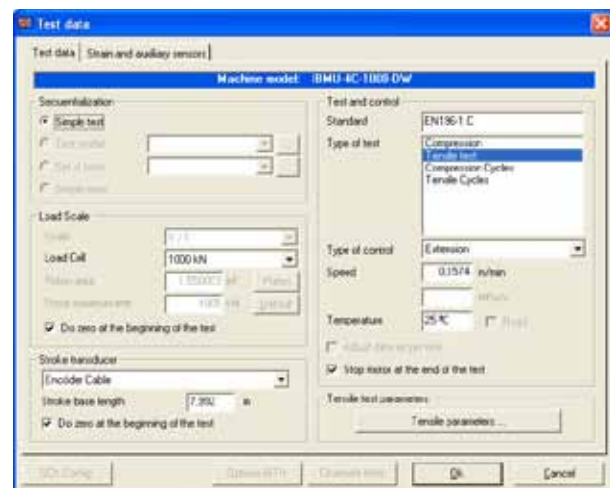
- › Design of **test reports**, fully customizable. Test reporting is essential for laboratories subjected to Good Laboratory Practices (GLP), or Quality Assurance Systems, as per ISO-EN 17025.

And many more options.

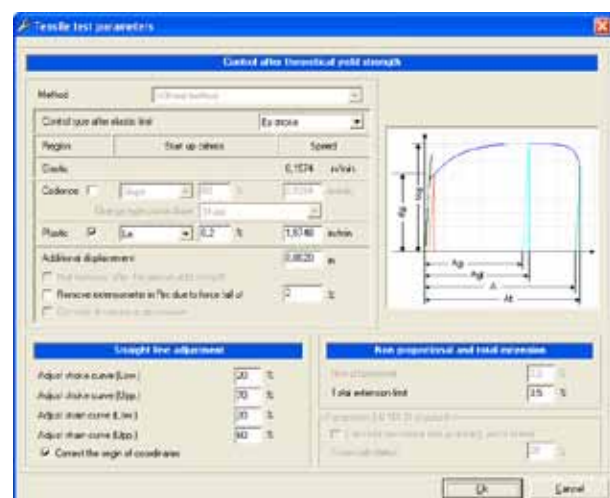
(1): For sensors previously installed into the system.



Testing machine setting-up



Configuration of Tests



Auxiliary window "traction parameters"
Available when selecting a tensile test.

2. SPECIMENS IDENTIFICATION

By means of window: "Specimen Parameters", user has multiple options to label specimens.

- › Name of test / specimen / sample, origin, batch, client, auto-numbering, date, etc.
- › Test material, geometry of the specimen (length, width, diameter), mass, density, etc..
- › Free text. For adding any important info not reflected above.

Some parameters are involved in automatic calculations of test results, while others only will appear in the report (and / or screen of results) as useful background information to aid you in your analysis.

3. TEST DEVELOPMENT

The program performs tests automatically, according to the method and parameters previously introduced in the test configuration.

For test monitoring , PC screen shows shows, in real time, following features:

- › Graphical representation: XY charts of load-stroke, load-strain, stroke-strain, etc.
- › Instant numerical values, obtained by the sensors connected to the system (position, load, strain, etc).
- › Real-time execution and presentation, of the results of the calculations pre-programmed by the user with the integrated programmable calculator.

If something goes wrong, the user can stop the test at any time during its execution.

4. TEST RESULTS: ANALYSIS AND MANAGEMENT.

Once test is completed, results and the graphical representation are shown in the screen. If user rejects the test, results won't be stored. Before validating the test, you can perform following actions:

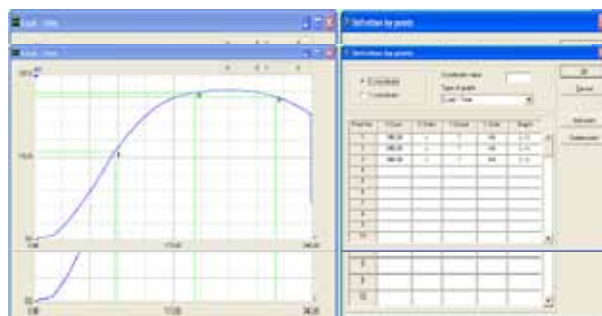
- › Select and expand areas of the graph (zoom).
- › Change the type of XY chart.
- › Location and search for singular points of the chart.

The statistical program allows you to compare several tests including consecutive superimpose curves, create 2D and 3D bar and lines diagrams, create bmp images, etc.

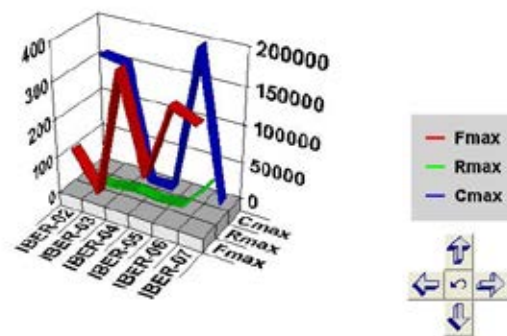
The output files can be converted to ASCII or CSV formats to be exported to other systems such as Excel, LIMS, etc.



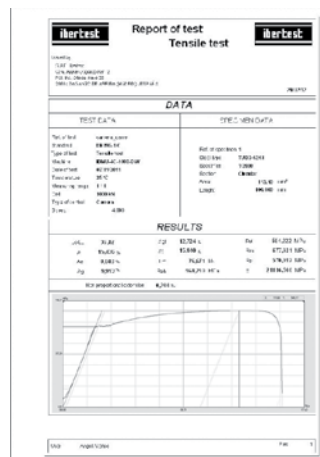
Setting parameters for the test piece



Location of significant points on the graph of the test



Test comparison - 3D representation



Example of a test report

Main Features

Operating system	WinTest32 works with all Microsoft™ Windows® (32 and 64 bits) operating systems (XP, Vista, Windows 7), and shares common features with other Windows® programs (system of menus, toolbars, file management, sizing of windows, colors, etc..)
Help functions (usability).	<p>The icon toolbar can be displayed as reduced version, including only the more common features and larger icons.</p> <p>The program is compatible with touch screen computers.</p> <p>The F1 key activates the help window. Help support includes a complete user manual for each application.</p>
Type of tests	Tensile, compression, flexure (one or two load points), bending, extrusion, penetration, shear, etc., on metallic and nonmetallic materials.
Test models	<p>WinTest32 comprises test models according to most commonly used standards (EN, ASTM, ISO, etc.). The user can configure similar test models.</p> <p>Under request, we can make modifications to configure your WinTest32 software to your special needs (consult additional cost)</p>
Cyclical testing	<p>WinTest32 allows to create cyclic tests, with rising, keeping or falling of the load applied to the specimen. The change of slope or ramp can be done in response to load, stroke or both figures inclusive.</p> <p>When necessary, the slope changes may be accompanied by the control mode (load or stroke) changes.</p>
Serial testing	<p>Possibility of grouping several tests together, in series and subseries.</p> <p>It is possible to obtain statistical information of the grouped tests parameters.</p>
Multi-frame control	Management of up to six testing zones, in alternately way, using the same PC and the same software. The software shows the available test zones to selecting.
Measurement channels	<p>Simultaneous representation of several measurement channels at once.</p> <p>WinTest can manage up to 16 channels (both deformation or auxiliars). The channels can be configured by the user. To use all features offered by WinTest32, you may need additional hardware.</p>
Calculator programming	<p>The system integrates a programmable formula calculator.</p> <p>In this way, you can combine parameters of the specimen with results or values obtained during the test, in order to obtain derivatives results (modules, strength, unit conversion, etc.) in real time.</p>
File management	Test results automatically recorded on hard disk, and the configuration of the machine at the time of their execution. These tests can be recovered for further analysis.
Data exportation	The output files can be exported in Excel format (csv or xls), allowing these files to be imported for most of the programs, word processors and spreadsheets on the market.
Statistics	<p>Incorporates the possibility of performing statistical analysis on tests previously recorded on hard disk.</p> <p>The statistics can be displayed as graphs, histograms, level with Gaussian distribution, charts, dimensional comparison (both tapes and volumes), test curves comparison by superimposing them on a diagram of coordinates, etc.</p>

TELEDIAGNOSIS (Optional Service)

TELEDIAGNOSIS is a remote diagnostic service and maintenance support, available for all IBERTEST testing machines equipped with the "W" system for control, programming and data-acquisition by means of computer.

To run TELEDIAGNOSIS a link program is used which establishes a remote connection to the control computer of the machine

When connected, our technicians are able to take control of the testing machine, as if they were in front of it, to act on the problem quickly and effectively, without displacements to your laboratory.

So, intervention from our Technical Service is possible regardless of the location of the machine, as long as an access to a fast Internet (ADSL or similar) is available..

Even on those occasions when the Technical Service must act "in situ", the TELEDIAGNOSIS is helpful to clearly identify the problem and choose the best solution to fix it.

In short, the immediate attention of TELEDIAGNOSIS service minimizes downtimes and avoids delays in the work of laboratory, while reducing or eliminating the overhead of moving the IBERTEST technicians.

During a TELEDIAGNOSIS session, the following actions can be performed:

- › **Software correction and review:** IBERTEST technicians can inspect the file system software WINTEST32 test, wrong configurations, lost files and directories, corrupted files by viruses, etc. Once detected errors, only the appropriate libraries and changes are transferred, without reinstalling complete programs..
- › **Remote handling:** IBERTEST technicians can handle the remote machine in real time to perform maneuvers, tests of mechanical movement, installation of testing transducers and accessories, verification of electrical and electronic systems, on/off alarm and security systems, etc.
- › **Videoconference:** Via web-cam a videoconference between client and our technicians can be maintained, thus we can get invaluable visual-information about the correct operation of the machine's mechanical and hydraulic systems. Also, by written or voice messages, it is possible to exchange views and comments, and give appropriate instructions to the user, when necessary, to perform some physical action in the machine.
- › **Updates.** The WINTEST32 software can be easily updated to its latest version (as long as the computer are able to support it). This allows enjoying the advantages resulting from the continuing work of review and program development.



IBERTEST Spain - Madrid Technical Services



Real time TELEDIAGNOSIS link



Laboratory of the end-user (anywhere in the world)

Several types of grips can be mounted on a testing machine. It's critical to define the appropriate gripping fixtures to assure a correct test execution.

The parameters to be taken into account are:

- › **Max test load:** to define the gripping strength needed
- › **Sample shape:** To define type of jaws surface: flat, v-shape, female thread, indirect tension, etc
- › **Sample dimensions:** to define separation between jaws, grip length and width, etc
- › **Sample material:** to define type of jaws surface:

Pyramid, wave, diamond coated, rubber coated, etc.



Type of test: static, dynamic (with or without zero passing), temperature, cycles.



Hydraulic
with lateral closing system



Pincer Grip



Eccentric Roller Grip



Scissor type
Grip



Pneumatic
Closing



Tailored-made
designs



Adhesive
Testing



Paper Test

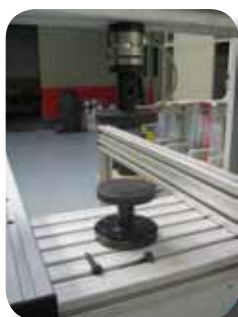


Rope Testing

Compression plates

Wide range depending on application needed

- › Ball and socket joint.
- › Circular or squared.
- › Increased surface hardness.
- › Manufactured on different materials (steel or hardened aluminum) to accomplish testing needs.

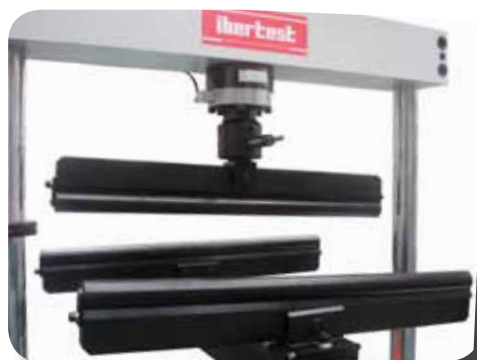


Different shapes available for fitting sample dimensions

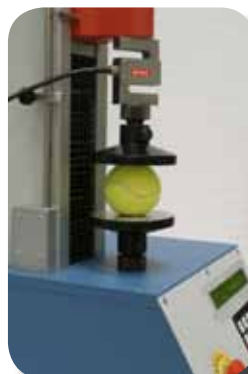
Bending and folding

Wide range depending on application need different rollers dimensions.

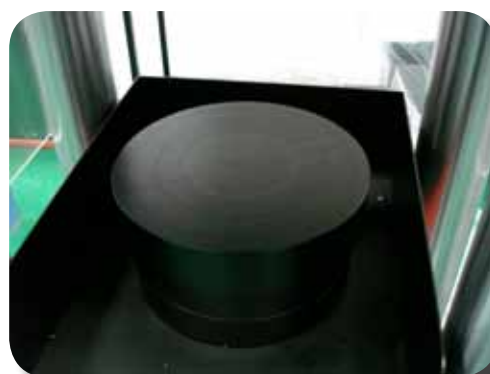
- › Adjustable separation: 3 or 4 points tests
- › Spinning and tilting rollers available



With tilting supports



Diverse applications on UTM



Compression plate MEH-AP-3000



3 and 4 points bending



Folding

Special designs

Tailored made developments for particular testing needs.

Dynamic Railways Testing



Locks testing



Corks testing



Elastic Railway-pads Testing

Gripping and extensometry solution for wood tensile testing



Temperature accessories

For medium and high temperature testing applications.



Ovens and furnaces



High temperature extensometers

